

## Chapter 4. Research and Demonstration

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### Introduction

Jackson Demonstration State Forest was acquired for the purpose of demonstration of economical forest management. State Board of Forestry and Fire Protection policy states: "to attain proper management of private timberlands in California, there is a need to investigate, develop, and demonstrate new and improved forest management methods to timberland owners and the public." JDSF is the largest publicly owned forest in California with a research and demonstration mandate.

Board policy further directs:

#### DEMONSTRATIONS AND EXPERIMENTS

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The Board, consistent with PRC Section 4631, recognizes and reaffirms that the primary purpose of State forests is to conduct demonstrations, investigations, and education in forest management. The Board wishes to emphasize and expand demonstrational, experimental, and educational activities on the State forests. Accordingly, in the operation of State forests, the Department will:

- A. Conduct a balanced program of demonstrations and investigations in silviculture, mensuration, logging methods, economics, hydrology, protection, and recreation; directed to the needs of the general public, small forest landowners, timber operators and the timber industry.
- B. Continue and develop procedures to assure dissemination of information obtained on State forests to forest landowners, (especially small owners), timber operators, and the general public.
- C. Integrate the Department's Service Forestry Program with State forest demonstration activities to more effectively reach small forest landowners and the general public.
- D. Conduct periodic field tours to exhibit State forest activities and accomplishments to forest industry, small forest landowners, relevant public agencies, and the general public. Field tours should be initiated by the Department and conducted at such times and places to encourage general public attendance.
- E. Seek special funding as needed from the Legislature to support specific research projects on State forests.
- F. Consult with and solicit the cooperation of the State universities and colleges, U.S. Forest Service, and other public and private agencies in conducting studies requiring special knowledge. Enter into cooperative agreements with other public and private agencies for investigating forest management problems of mutual interest. It is particularly of mutual benefit to make the State forests available to educational institutions, and other agencies for research projects.
- G. Cooperate with the Department of Parks and Recreation in establishing forest management demonstration areas compatible with recreation for

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educational purposes adjacent to the Mendocino Woodlands Outdoor Center on Jackson State Forest.

Research, demonstration, and data collection conducted over the past 50 years within the state forest system has focused largely upon timber-related issues and, in terms of JDSF, watershed effects (e.g., Caspar Creek Watershed Study). Common subjects have included silvicultural systems, timber yarding practices, timber and log inventory, and sediment and stream-flow.

Within the past 15 years, the scope of forest research has expanded to include biological resources found within the forest environment. Evidence of this can be found in numerous publications associated with the Caspar Creek Watershed Study (U.S.F.S. and CDF).

The primary goal of JDSF during the planning period will be to improve the amount and quality of information concerning economic forest management and timber management methods that are available to the public, small forest landowners, resource professionals, timber operators, the timber industry, and researchers. This goal can be met by conducting demonstrations and investigations through consultation and cooperation with universities and colleges, Federal agencies, and other public and private researchers. Increased funding and staffing should be pursued to accelerate the expansion of knowledge through additional demonstration and research efforts and establishment of a Forest Learning and Interpretive Center on JDSF.

Jackson Demonstration State Forest is committed to providing innovative demonstrations, experiments and education. The number of acres and breadth of age classes and seral stages contained within JDSF will allow for large landscape level research and demonstrations to complement stand and individual project level work. JDSF will demonstrate the full range of intensity of forest management while maintaining a diversity of stand conditions for future research not yet known. JDSF explicitly acknowledges that forest management is a much broader concept than the growth and yield of merchantable timber. Special concern areas such as riparian and older forest corridors, unusual plant communities, ecological hypotheses surrounding the use of corridors or structural elements, and individual species are all worthy topics for examination within the research and demonstration program.

There remains a great deal of uncertainty in the regulation of forest management activities to maintain maximum sustained production, and in the level of mitigation necessary to protect and enhance watersheds and wildlife habitats. Regulatory standards are often established in a forum that combines and balances scientific knowledge, landowner rights and desires, and legal constraints. There is a growing need to determine the environmental effects and costs of regulatory standards as applied or proposed for application in the field. The State Forest should remain available to assist landowners and regulatory agencies in this effort. It can be desirable to test a range of variables or conditions, such as buffer widths and clearcut sizes to be able to make scientifically valid comparisons of the effects of various management options. CDF will work with the Board, and State and Federal regulatory agencies in order to establish a mechanism or process by which the system of State Forests can be a testing ground for various levels of regulation and mitigation. This may require the Department to seek limited exemption from certain regulatory or standard mitigation requirements. Designating specific areas as experimental forest under CEQA or the Forest Practice Act might be one exemption method used. This process will remain sufficiently constrained to maintain public confidence in the overall management of the Forest.

The research and demonstration, timber management and recreation programs of the State forest will be integrated to the degree that current operational timber management practices can be used to effectively demonstrate Best Management Practices and a variety of silvicultural systems, including alternative treatments and innovative experimental practices. Recreational use of JDSF offers the State an opportunity to introduce the public to timberland management through casual encounter, guided trails, roadside displays, etc. Jackson Demonstration State

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Forest will seek out and apply new and emerging management practices in order to expand our knowledge of forest management practices and their effect on the ecosystem. In order to achieve this objective, State Forest staff will maintain a continuous exchange of ideas and information with forest landowners through advisory groups, publications, symposia, workshops, and professional contacts.

Many of the projects and studies done on the state forest have excellent demonstration potential. Many of the project sites are visited numerous times each year by tour groups. These sites include uneven-aged silvicultural study areas such as the Railroad Gulch Silvicultural Study and the Caspar Creek Cutting Trials as well as all of the operational timber sale areas where selection cutting has been done. Even and uneven-aged silviculture has been successfully combined with investigations of watershed processes and rehabilitation and fisheries demonstration in the Caspar Creek Watershed Study. Both the North and South Forks of Caspar Creek are used frequently for demonstrating these subjects to a wide range of clientele. Vegetation management is done extensively on the State Forest and has been successfully demonstrated in its various stages to many groups. Young stand management using precommercial thinning techniques and mature stand stocking control using commercial thinning can be viewed in many of the past timber sale areas for demonstrational purposes. A range of age-classes has developed on the Forest, which constitutes a valuable demonstration opportunity.

JDSF staff includes three full-time positions dedicated to research and demonstration (Forester II, Forester I, and Forestry Assistant II). A research coordinator and a biometrician are located at CDF's Sacramento headquarters.

### **Planning for Future Research and Demonstration**

#### **Key Areas of Increasing Effort**

The Department intends to manage the state forest system as a demonstration of sustainable forest management, while creating and maintaining a diverse forest laboratory available for research on a vast array of subjects. Informational needs associated with forest management are very large and changing. At JDSF, this underscores the importance of maintenance or creation of a varied forested landscape, while being mindful of the need to remain relevant to the informational needs associated with management of private timberlands. For these reasons, the following become key factors in a long-term research plan:

- Increasing quantification of the forest
- Creation of a varied landscape while managing in accordance with approved management plans.
- Detailed documentation and quantification of changes due to management activity.
- Continued and increasing monitoring of various aspects of the forest environment to enable assessment of trends and conditions. Efforts will be made to move away from qualitative assessments to scientifically defensible tests of individual practice effectiveness. This adaptive management feedback loop will provide a mechanism to alter existing and proposed management practices where necessary.
- Conduct of specific research designed to answer critical questions identified by the Board and the Demonstration State Forest Advisory Group or other advisory bodies that may be established.

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Increasing resource allocation to each of these activities over time will be key to the ultimate effectiveness of the state forest system. CDF's intent is to accomplish this through internal funding, grants, and cooperative arrangements with various partners.

### Experimental Design – Replications and Controls

As a research and demonstration forest, JDSF is in the unique position of preparing for the eventuality of unknown future research projects with objectives that are likely to be substantially different from those of today. The research and demonstration program staff will participate in the forest management planning process to help keep options open and maintain a wide range of conditions in the field for future research installations.

A significant objective during the planning period will be to create and maintain a system of replicated diverse stand structures and potential control areas throughout the Forest. This system is planned to be able to accommodate a wide range of experimental designs that require replication of treatments.

This system of replicated stand structure will include a flexible strategy for creating control areas. Some stands may be set aside temporarily, or for longer periods, if needed, as controls to assess baseline change over time, and may be established as components of specific research proposals. The assignment of areas and specific locations of experimental controls will be a dynamic process as stand development evolves over time or as different research projects are initiated and completed. When a particular timber stand has fulfilled its function as a control, it will become available for harvesting and another area within the watershed may be designated as a new control.

### Watershed-level Research

The forested environment is composed of an interacting set of biological and physical resources and processes. Future management should create conditions that facilitate needed research into these interacting factors. For example, forested watersheds possess essential habitats and habitat elements for both terrestrial and aquatic species. The interactions and dependencies between these resources combine with management activities intended to increase timber production levels to create complex forest management challenges. State forest management should enable an increasing level of research at the watershed level or similar scale. Increasing paired watershed studies, combining detailed examinations of habitats and timber production, should be a goal within the state forest system.

### Testing and Comparing Management Goals and Intensity

Developing information on the effects of common or anticipated practices conducted at varying levels of intensity is a key aspect of forest management research. The North Fork phase of the Caspar Creek Watershed Study embodies this philosophy. In this study area, an attempt was made to create effects that could be quantified and evaluated. Watershed studies can serve this purpose by applying differing types of management at varying levels of intensity. For example, one watershed may be managed to simulate a very high level of timber production, another is managed at a lesser intensity designed to foster both timber and other resource values, and a third is held as a control. This also serves to compare and contrast management by the various owner behavior groups characteristic of the private sector.

### Anticipating Change

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Forest management is a long-term enterprise. Generally speaking, forest stand and ownership-wide development is placed on a trajectory that requires many decades to reach a desired condition. However, ownership patterns and management objectives may undergo more rapid change in response to changes in economics and social values.

The state forest system should be capable of periodically assessing these changes, and attempt to anticipate the necessary forest management response. This focuses the need for continuation of state forest advisory structures, as well as periodic review of management direction by the Board. The changing climate of forest management should be a matter of periodic discussion by the State Forest Advisory Committee, and can serve as an important source of counsel and advice on management direction and research needs.

### Increase Research Capability

In order to maximize effectiveness in dealing with the key areas of a long-term research plan (see bullets above), the capability of state forest staff should be expanded to include expertise in a broad range of environmental fields. This would provide greater capability to anticipate, facilitate, coordinate, and conduct research within the state forest system (see the tiered research, demonstration, and monitoring plan within this chapter for an indication of preferred expertise that could be added to the state forest system). In one step in this direction, a wildlife biologist position was added to the Forest in the 2006/07 fiscal year.

### Cooperatives

The most efficient use of resources is frequently found through cooperative arrangements. These include research cooperatives with landowners and universities, and agreements with other agencies. The Caspar Creek Watershed Study is an example of an agreement with another agency, the USFS Pacific Southwest Experiment Station, Redwood Sciences Laboratory. The CACTOS and GSPACE cooperatives are examples of industry/university research coops in which CDF has participated. CALFORNET, a new concept of a joint effort by CDF and the three forestry universities in the State is another example of cooperation. This effort is attempting to coordinate research and demonstration projects between CDF and the university forests to maximize the effectiveness of available funds.

Additional efforts must be made to coordinate with other state and federal agencies. Particular efforts should be made to cooperate with fisheries and marine scientists at and near Jackson Demonstration State Forest. The pursuit of cooperative funding to leverage existing funds from CDF should be made where feasible.

### Expand Forest Size and Forest Types Represented

To enhance capability to conduct effective forest management research consideration should be given to expanding JDSF and the other state forests to enable research at the larger watershed or large stand level. In addition, consideration should be given to increasing the number of state forests in order to represent all of the major forest types within the various forest regions subject to regulation by the Board of Forestry and Fire Protection.

## **Research and Demonstration Needs**

### Advisory Committees

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With potentially conflicting demands for research and demonstration exist, a process for identification of needs, prioritization, and allocation of funding is necessary. The Demonstration State Forest Advisory Group will provide overview and assist in the identification and prioritization of research and demonstration projects in order to provide appropriate representation for the public, timberland owners, resource professionals, educational institutions, state and local government, and state forest management staff. The Demonstration State Forest Advisory Group is appointed and serves at the pleasure of the Director, providing a source of counsel on specific issues brought to the committee by the Director or staff on behalf of the Director. The Group represents the entire State Forest system. Past research topic suggestions and recommendations from various entities are contained in Appendix III (Research and Demonstration Program).

CDF is currently working to develop a new research and demonstration advisory body to provide scientific and technical guidance regarding research and demonstration activities on the Demonstration State Forests. CDF anticipates that this group will be established during the first quarter of 2007.

### Competitive Research Grants

Beginning in fiscal year 1999, funds have been allocated from the Forest Resource Improvement Fund (FRIF) to support expanded research within the State Forest system. This money is available to researchers and others through a competitive grants program that is administered by the CDF Sacramento State Forest staff. A request for proposals (RFP) will be issued by the Department no more frequently than annually and will skip a year when available funds are insufficient to justify it. CDF, in conjunction with subject area experts, will review the proposals. CDF staff will implement a scoring system based upon criteria listed in the RFP. Proposals will be ranked, allowing extra points for certified small businesses or any other special consideration required by law. The top proposals are awarded until the funds are exhausted. Frequently, projects are multi-year and some flexibility exists to maximize the number of projects funded. A fund reserve shall be kept for miscellaneous projects that occur outside the RFP process. Contracts for approved projects are developed in Sacramento. State Forest staff will administer most contracts.

### Future Funding Levels

Sacramento staff has responsibility for the coordination of research state-wide. They also have the responsibility to administer a competitive grant program available for State Forest research. The current authorized level of funding available for State Forest System research is about \$1 million per year, including about \$180,000 specifically earmarked for JDSF. Although authorized, this level of funds has not actually been available due to revenue constraints. Strong interest shown by both the numbers of individuals applying for research funding in the past, and by individuals and organizations inquiring about potential research results, indicates the need to increase funding levels substantially. An increase in annual funding to match the level of demand for forest research would be beneficial. When opportunities arise, staff will attempt to find funds for research proposals.

### Research Scoping Criteria

State Forest staff has formulated a series of questions designed to establish the relevancy and priority for proposals suggested by staff or received from other sources.

- Is the research project consistent with the legislative mandate and with the policy set by the State Board of Forestry and Fire Protection?

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- How does the relative importance and urgency of the research project rank in the list of issues that should be addressed during the plan period?
- What are the expected applications and benefits of the research project versus the projected costs of implementation both short term and long term?
- How does the research project affect other programs on the State Forest and other projects or demonstrations with other cooperators?
- How well does the research project address multiple resource sustainability and environmental concern issues that may be associated with the treatments?
- How well does the research program address problems related to long term trends?

### State Forest Identified Research Priorities

Using the process identified above, the Forest staff has identified a number of research priorities for the planning period that will be considered together with priorities identified by other sources. These include:

- Quantitative assessment of the effectiveness of the delineated upland and riparian corridors in providing habitat and expanding the forest occupancy for identified species of concern (ref. mgmt plan).
- Carbon sequestration as a management option, including the economic and social benefits in mitigating the greenhouse effects (ref. mgmt plan).
- Develop partnerships and fund research giving priority to information gaps such as below-ground carbon cycles, fog drip utilization by tree and understory plants, methods to hasten development of older forest structure, and climatic tolerances of species (ref. mgmt plan).
- Research on the short-term and long-term costs and effectiveness of various forest resource protection measures.
- Fisheries studies that include channel habitat, population dynamics, and off site conditions.
- Young stand management that includes stocking level and precommercial thinning studies.
- Riparian zone wildlife habitat relationship studies that include topics such as stream buffer enhancement and maintenance, and relationships between forest cover, wildlife connectivity corridors and wildlife population trends.
- Watershed management that includes sediment yield, stream discharge, sediment sources, road abandonment, watershed rehabilitation, and harvest reentry studies.
- Upland zone wildlife relationships that include habitat relationships, forest fragmentation, edge effects, connectivity and forest corridors.
- Investigation of optimal element and spatial configurations of structural elements retained during timber harvesting activities.
- Approaches to speeding up development of older forest or late seral forest characteristics in second-growth stands.
- Role of basal hollows in improving habitat including methods to create these structures without fire.
- Silvicultural systems that include even and uneven-aged management systems.
- Vegetation management that includes control of invasive weed species, brush competition in plantations, and prescribed fire.
- Public education on forest resources, technologies and issues.
- Forest growth model development that includes gathering data for and improving existing models (CRYPTOS).
- Forest data systems development for creating, improving and maintaining a data bank on existing and new data that include both database and GIS data layers.
- Habitat development modeling, including assessment of habitat availability and habitat connectivity.

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### On-Going Current Research and Demonstration Projects

A number of ongoing research and demonstration projects that will require action during the planning period are listed and briefly described below.

#### Caspar Creek Watershed Project:

This long-term watershed project was initiated in 1962 to monitor the effects of timber management upon various watershed processes. A new South Fork phase was initiated in 1999. The Caspar Creek Watershed study is monitored continuously. JDSF is responsible for infrastructure maintenance, including roads, trails, field data collection sites, fish ladders, and the periodic cleaning out of the sediment behind the North Fork and South Fork Caspar gauging weirs.

#### Caspar Creek Cutting Trials (Control Area):

This unmanaged five-acre stand of second growth was initially measured for timber stand characteristics, i.e. stocking level, in 1959. It has been periodically re-measured and was last measured in 2006. It should be scheduled for another measurement in 2016 to assess the stands relationship to culmination of mean annual increment.

#### Caspar Creek Precommercial Thinning Study:

This young stand of third-growth redwood was precommercially thinned to various stocking levels in 1980. The area has been measured periodically since that time, with the most recent measurement in 1998. This area should be measured again in 2008 or 2009.

#### Middle Fork Caspar Creek Advanced Regeneration Study:

This mature second growth stand was initially harvested in the 1960's. The second entry removed most of the overstory leaving suppressed trees as advanced regeneration. Plots were established in 1987 to monitor the growth of these trees and to compare with plots where these trees were cut to provide for new sprouting. A re-measurement is scheduled for this planning period.

#### Whiskey Springs Commercial Thinning Study:

This stand of second-growth redwood was commercially thinned to several redwood stocking levels in 1970. The most recent measurement occurred in 2005. Portions of this study may be manipulated for use in other studies investigating redwood-stocking levels. This stand should be scheduled for measurement again in 2015.

#### Hare Creek Sprout Stocking Study:

This demonstration of stand development from a regeneration harvest started in 1986 has had two re-measurements since the installation, the last done in 1998. One re-measurement should be done in 2008.

#### Railroad Gulch Selection Silviculture Study:

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This demonstration of various selection cutting methods and levels was initiated in 1984 and was re-measured in 2003. Focused silvicultural analyses are currently being conducted by UC Berkeley. An analysis of the data, silvicultural prescription, and second entry timing will occur during the plan period.

### Parlin Fork LWD Study:

This demonstration of artificially loading stream channel sections with large woody debris to improve fish habitat was initiated in 1996. The most recent measurement occurred in 2006. Periodic re-measurements may be done during the plan period.

### Hare Creek/Caspar Creek LWD Study:

This demonstration is similar to the Parlin Fork LWD study in testing techniques to improve fish habitat. The main channel in each had LWD placed in 1999. The most recent measurement of the large woody debris occurred in 2006. Periodic re-measurement of wood debris in the channel and juvenile fish populations will occur during the plan period.

### Asymmetrical Coast Redwood Growth Model Study:

This study was initiated in 1986 to develop a process based coast redwood growth model and a mechanism to thin a stand to optimize stand growth and yield. Re-measurement of the thinned stand using the developed specifications was completed in 2006. Analysis of the data to verify the growth model projections will occur during the plan period.

### A Long Term Precommercial Thinning Study in Coast Redwood:

The study established in 2001 is a long term precommercial thinning trial in the coast redwood type which tests 1) a range of stocking levels; 2) the growth response over a range of environmental and management activities including broadcast burning, herbicide application, slope, aspect, age and site; and 3) the optimal stand age for conducting the PCT treatment. The study will also provide data, which may be used to expand the CRYPTOS growth model for ages from zero to 20 years. The first remeasurement will occur during the plan period.

### Road Surface Erosion Study:

This is a pilot study measuring road surface erosion by David Tomberlin, National Marine Fisheries Service and JDSF. Initiated in 2004, it includes the manufacture and installation of ten collection devices on JDSF that capture water from ditch relief culvert outlets. JDSF is collecting data on coarse sediment, suspended sediment, and water quality.

### Demonstration

Creating opportunities for demonstration of various silvicultural systems, forest structures, and wildlife habitats will be a significant focus of effort. Two demonstration areas, one on the west and one on the east side of the Forest are proposed. Planning specific demonstrational features and development of these areas, with input from the public will occur during the planning period.

Timber stands that contain various habitat conditions can be both valuable demonstrational areas and provide opportunities for research on both riparian and upland species and associated effects

of management actions. Topics relevant to sustainable wildlife habitat such as forest fragmentation, landscape connectivity and edge effects have a high priority for research in the planning period. Information needed for landscape connectivity assessment for example, includes species movement, response to patch structure, gap crossing ability and dispersal distance most of which is unknown for most vertebrate species.

All currently recognized silvicultural systems will potentially be available for demonstrational and operational purposes. Uneven-aged management is of great interest to non-industrial forestland owners, and a large land allocation on the State Forest will be devoted to silviculture systems which produce these kinds of stands. To a lesser extent, stand structures exhibiting even-aged silviculture systems such as clear-cutting, seed or structure tree and shelterwood will also be created and maintained. All of these sites are transient in their ability to convey certain demonstrational qualities so management efforts also have to emphasize maintaining all these kinds of stand conditions in different locations over time. It is also important to retain stands that have similar characteristics to other forest stands in other ownerships in the region so that relevant management techniques can be demonstrated. The effectiveness of demonstrational areas depends in part on the completeness of the information that is available to interested clientele.

Information packets may be developed and maintained which focus on the demonstrational qualities of a particular site. These packets are often used as one type of information transfer medium on tours and similar events. Keeping the information packets current requires periodic records updating relating to management actions and stand development. Particular sites may warrant permanent informational or interpretive displays. Sites that are relatively secure in terms of potential vandalism and have high demonstrational value have a higher priority, i.e. The Railroad Gulch Silvicultural Study area. This site is adjacent to the Woodlands Outdoor Education Center and a permanent interpretive display may receive a high amount of use. A proposal will be made to the California Department of Parks and Recreation to jointly develop areas for forest demonstration areas that are adjacent to the Woodlands Center and to the Pygmy Forest Reserve.

### Tours

As in the past, tours are given by request to a wide range of groups each year. Tours have been given to school classes ranging from kindergarten to college emphasizing natural resource education, ecology, and forest management. Other tours have been given to professional organizations such as The Society of American Foresters and to policy-making bodies such as the Board of Forestry and Fire Protection. Other clientele include visiting research scientists from across the world who are interested in specific research activities being done on JDSF. Other organizations such as the Western Research Forest Managers group who meet annually at one research forest have been hosted on JDSF. Timber industry foresters have been given tours on the forest so that management techniques that are used on the Forest can be passed along to the private sector.

As part of future activities, a regularly scheduled program of tours – 3 to 4 per year - is planned to show, explain and interpret the changing landscape and type of management which is being done on JDSF. It is our intent to enhance the public view of JDSF as an open house. This series of tours, each of which could be focused on different aspects of management or research, would complement the requested tours. Such scheduled tours will be well advertised with an agenda and handouts to supplement the discussion at various stops.

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### State Forest Data Bank

Developing a State Forest data bank for documentation of management activities will be a priority task during this plan period. Current computer technologies permit efficient electronic storage and retrieval of all types of resource information including graphics. A formal procedure for input of all types of research and operational data into the bank will be developed during this planning period. Researchers and forest staff will be able to access all information that has been documented and reported on through one system in a timely and efficient manner. Proper development of the data bank and its use will also be a tremendous asset in the monitoring and adaptive management part of the forest program. The system will help to prevent duplication of data collection and accelerate the process of progressing to the next step in specific research areas. This central data bank also minimizes the chance of data loss and serves as one form of institutional memory, especially important with long-term projects such as the Caspar Watershed study, which has a 100-year planning horizon.

Important components to consider in the development of this databank include a database of important statistical data associated with various management actions such as timing, before and after timber stand attributes or other associated resource information. Another is a database link between raw data and the associated reports that provide the data analysis and conclusions about management actions and studies. The photo coverage described above is an important element of the databank. A spatial link can be provided in the form of GIS coverage on all management areas and actions. This GIS environment is an excellent platform to tie all these resources together and will be an important component for continued development during this period. This will require the services of a dedicated GIS specialist on staff in coordination with state forest staff.

As part of a complete documentation of activities, a consistent and organized effort towards building a photographic record of state forest activities and forest development is needed. An attempt will be made to establish and maintain a set of photo points. The advent of digital photography and digital storage allows the relatively easy electronic storage of photos which can then be made available over the internet as part of the public education and technology transfer components of the program.

### Internet Web Site

The exponential increase of Internet use as an information tool by all clientele groups makes it an important technology transfer and public relations medium. In coordination with the Unit and Sacramento, the current internet web pages which describe the State Forest system will be expanded to include forest descriptions and statistics in much greater detail. Access to publications is currently available on [www.demoforests.net](http://www.demoforests.net). This web site is being updated with materials from JDSF and is the first phase of the data bank. Over the planning period, additional types of publications will be made available for viewing and download. GIS information on many types of forest attributes will become available for viewing using free viewer programs such as ArcExplorer. Links to other related or affiliated organizations will be made part of the web site. Periodic updates to the page will be done as management activities change the status of forest conditions.

### Publications

The Jackson Demonstration State Forest newsletter is a state forest publication designed to quickly transfer information regarding management, recreation, and research activities on the Forest. It is written, formatted, and reviewed by CDF Forest and Unit staff as a publication of the Mendocino Unit. It is currently printed using the Department of Corrections print shop facilities. This format started in the early eighties with almost fifty issues having been published and sent to

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a mailing list of over 400. It is the intent to publish a minimum of two newsletters per year. This will allow the timely transfer of information about current events and activities on the state forest. The Demonstration State Forests newsletter is a system-wide vehicle for outreach and is published out of the Sacramento office with contributions from the forests. These publications are available on-line.

The State Forests Research and Demonstration Newsletter, initiated in the spring of 2003, is produced by the State Forest Research Coordinator in Sacramento. It covers research and demonstration projects from all of California's state forests. The goal is to keep the public informed of the on-going commitment CDF has to increasing our knowledge-base and research data, and to share the findings these projects have produced with foresters, research scientists and the public. These publications are available on-line.

The California Forestry Note has been the CDF publication for state forest activities since 1960 (originally called State Forest Notes). More recently, the California Forestry Report series was created for more lengthy publications. Most research projects should produce at least one California Forestry Note or Report (see below). Reprints from other peer-reviewed publications may also be available. Sacramento staff serves as the editor and publisher of these series with technical assistance from State Forest staff. Research projects such as the Caspar Watershed Study, Caspar Cutting Trials, Railroad Gulch Silvicultural Study, Redwood Sprout Study, and Hare Creek Sprout Study have been reported on in this series. These publications are available on-line.

Forestry Reports are oriented towards a professional or research audience. The writing is more technical and lengthy than that found in the California Forestry Note. Generally, at least one of the authors is a State employee. Four reports were edited and published by Sacramento staff in 2004 and 2005. These publications are available on-line.

Most research contracts contain a report requirement. These reports are often summarized in a State Forest publication or are further developed by the researcher for submittal to professional journals. All reports submitted since 2001 are available on-line. Earlier reports will be added to the Internet web site during the plan period.

Numerous professional journals offer the possibility of technology transfer to a wider audience than might be contacted through the internal CDF publications. The primary researcher may desire to submit an article that reports on research done on JDSF to a peer reviewed journal. This will be encouraged as long as it does not abridge the right of CDF to publish research results in a CDF publication. CDF may also submit research reports to professional journals in addition to publication internally.

### Symposiums

Symposiums which cover a range of topics relevant to resource management in the coast redwood region will be planned for every five years to report on the results and status both from JDSF research and related external research. Smaller information transfer sessions will be conducted as an interim process to transfer information on a more timely basis. Two major conferences and one update session have been presented within the last decade. The first was the Coast Redwood Ecology Conference that was presented in 1996 at Humboldt State University in Arcata. Over 600 participants from all over the world attended the 3-day conference in which speakers presented on a wide variety of subjects regarding coast redwood management and ecology from many different organizations. The second conference followed in 1998 and was focused on the results of the second phase of the Caspar Watershed Study. This phase was designed to address the issue of cumulative watershed effects given the set of management activities applied to the watershed. This one-day conference was presented at the Mendocino College in Ukiah and attended by over 500 participants from all over the country. A one-day field

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tour of the watershed study area was given in conjunction with the symposium. A one-day information transfer session was presented in the spring of 2000 that focused on results from a number of recent research and monitoring studies. JDSF also participates in symposiums sponsored by other organizations such as the 2004 Redwood Region Science Symposium coordinated by the University of California Center for Forestry. In fact, 31% of the presentations and 26% of the posters at that event were associated with research from JDSF.

Proceedings will be developed from every conference that the State Forest sponsors. Interim results from several of the major research projects on JDSF were published in the proceedings resulting from the last two conferences. These included reports from multiple sub-studies of the Caspar Watershed Study, the Railroad Gulch Silvicultural Study, the Whiskey Springs Commercial thinning Study, and the Caspar Creek Precommercial thinning Study.

### Forest Learning Center

The construction of a Forest Learning Center is planned for implementation during the coming decade. The first building, completed in 2003, serves as a dormitory facility for visiting researchers and as an informal meeting place for groups that appreciate a facility half-way between Highway 101 and the Coast. The desired final build-out will include a conference center, classrooms, resource and research library, Internet access, State Forest Data Bank access, research lab, video conferencing, and administrative offices as part of the complex. The research library will be created from existing libraries on the state forest and will be updated gradually over the planning period with literature on all subjects relevant to the effective management of the state forest. This activity will be part of the Education Forester responsibilities in conjunction with other forest staff.

There will also be institutional network access to other research facilities and research forests nationwide, including Sequoia Demonstration State Forest, U. C. Berkeley's Blodgett Forest, California Polytechnic State University's Swanton Pacific Forest, and Humboldt State University's School Forest. This Center will provide the resources to do needed research in a productive and cost efficient manner. Group education sessions can be held simultaneously, taking advantage of the latest research results. This facility will be built on the State Forest in an area representative of the coast redwood/Douglas-fir ecosystem. Access from Highway 20, as well as high speed Internet access, will be important considerations in determining where this facility will be located. The location of the Forest Learning Center should allow for the expansion of facilities over time, and may include space for the possible siting of a new State Forest headquarters as well. The Forest Learning Center will be located and designed in accordance with the CEQA process to not significantly affect day or night time views from campgrounds or residential areas. The operations of the State Forest and activities of the Forest Learning Center need to be closely connected. A long distance between facilities may impair the potential to integrate forest operations with the research and demonstrations program.

### JDSF Interpretive Center

The construction of a JDSF Interpretive Center will be planned for completion in conjunction with the Forestry Learning Center. This facility may be built near the historic schoolhouse located in the Camp 20 area. This site is adjacent to Highway 20. This location will be capable of serving the many thousands of forest visitors traveling through the State Forest each year. An opportunity will be provided for the public to learn about forest ecology, forest management, and the unique mission of the State Forest.

The Interpretative Center will provide museum space for early logging and prehistoric artifacts found on the State Forest as well as up-to-date displays of JDSF research and demonstration programs. Forest visitors will be able to obtain camping permits, maps, trail brochures, wildlife

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and vegetation lists, firewood and mushroom collection permits. Other resources available to the public may include a bibliography of State Forest research, natural history books relevant to coast redwood ecosystems, and updated schedules of proposed tours and seminars. This Center will also include a classroom space for approximately 30 students, rest rooms, and outdoor picnic facilities. The State Forest would seek to develop a memorandum of understanding (MOU) with local school districts, Mendocino Woodlands, and State Parks to provide a comprehensive interpretative program for school-aged children and forest visitors on forest management and ecology issues. This MOU will include program space for CDF's Project Learning Tree, and will seek to develop a close working relationship with the Forestry Institute for Teachers and other educational programs.

### Public and Professional Education

Forestry education is a vital component of the research and demonstration program. A JDSF Forest Learning Center in conjunction with the Interpretative Center at Camp 20 will provide the structure to facilitate a comprehensive education program. The clientele for this component of the program encompass all grade levels of school up through postgraduate, forest landowners, resource professionals, and the public. Developing and using demonstration areas will be an important component of this program. A volunteer docent will help staff the interpretative center/museum that will have books relating to various resources found on the Forest. Tours can start from here, accessing the middle and eastern part of the Forest. Another effort will be in developing forest demonstration trails that serve both natural resource interpretive purposes and demonstrations of active forest management. A MOU with local school districts, the Mendocino Woodlands Center for Outdoor Education, and State Parks will help school-aged children and forest visitors develop a better understanding of a healthy managed forest. Personnel dedicated to public education would lead this outreach effort. All of these initiatives are examples where the demonstration and recreation programs can complement one another to maximize their potential benefits.

Additional staffing is required to fulfill the needs of this component.

### **Mitigations and Monitoring for Research Projects**

The varied nature of proposed research projects precludes applying specific mitigation measures to each proposed project. Rather, each project will need scoping and further assessment to determine the applicable mitigations needed.

Impact assessment and mitigation are stated in general terms where the specific details of a particular activity are not known, and cannot be known at this time. This is particularly true for our Program EIR that must forecast the impacts of actions resulting from policy decisions. Most often, programmatic or policy-level mitigation is either included in the DFMP or is provided as part of the accompanying EIR. Individual project level mitigation may be deferred to a subsequent impact assessment where the scope or site-specific details of the action are currently speculative, not fully known, or not analyzed to a sufficient degree in the EIR. In these cases, additional CEQA review is required once the activity is fully defined in terms of scope, location and other factors. This review, where necessary for identification of additional mitigation, will occur in the development of Timber Harvesting Plans, EIRs, or negative declarations that tier off of the EIR.

#### *Research projects incorporating manipulation of forest stands and vegetation*

Although even-aged management will be used on the Forest, the area where it can be demonstrated has been restricted to specific management units. In addition, structural elements of value to wildlife will be retained within or adjacent to even-aged harvest units. One-aged

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stands (commonly created through clearcutting) are expected to be limited to research projects and for timber stands with very difficult conifer regeneration issues. Creation of such stands will be limited to no more than 100 cumulative acres per decade. A specific research or demonstration project may require the acceleration or delay of an even-aged regeneration harvest.

Refer to mitigations and monitoring requirements contained within this management plan:  
Chapter 3 – Forest Management

Refer to mitigations and monitoring requirements contained within this management plan:  
Chapter 3 – Recreation, Aesthetics, and Public Use.

As part of JDSF's research and demonstration mission, small-scale herbicide trials or vegetation control studies are appropriate. These activities may utilize products that are not listed in the EIR.

Fertilization will not be used as a stand improvement practice on JDSF except in conjunction with a specific research project. No fertilization research projects are currently under consideration.

The possibility of removal of Pygmy Forest vegetation by prescribed fire was noted in the DFMP with reference to the habitat development for the Lotus Blue Butterfly. The EIR recognizes that this type of project should be given careful analysis by qualified botanist in addition to species surveys and mitigation measures detailed previously. T. Sholars has described some possible restoration and research projects involving prescribed fire for Pygmy forest on JDSF (1997). These projects will require additional analysis appropriate for a CNDDDB recognized sensitive plant community.

Refer to mitigations and monitoring requirements contained within this management plan:  
Chapter 3 – Forest Management.

### *Research projects that may affect wildlife and ecological processes*

Refer to mitigations and monitoring requirements contained within this management plan:  
Chapter 3 – Wildlife and Ecological Processes.

### *Research projects that may have an impact on watershed resources*

A potential area of concern for water quality impacts is the research activities conducted on the Caspar Creek experimental watershed. Current research and management activities on that watershed are not resulting in any significant water quality impacts. Future research projects will be assessed and, if needed, mitigated to prevent violation of water quality or discharge standards; however, no specific new projects are currently being contemplated that could be considered within this EIR. Independent CEQA analysis will be required for any future research projects on the Caspar Creek experimental watershed.

Except as modified to support research conducted under appropriate authorities, watercourse protection measures will include all applicable Forest Practice Rules and will at all times meet or exceed the levels specified in the appropriate mitigation and monitoring section of this management plan. For specific research and demonstration purposes related to ecological questions (e.g., exploring the role of streamside canopy openings in increasing benthic productivity and fish response), the mitigations required for timber harvest harvesting operations may be overridden.

Refer to mitigations and monitoring requirements contained within this management plan:  
Chapter 3 – Watersheds.

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*Research projects that may have an impact on Recreation, Aesthetics and Public Use:*

One-aged stands (commonly created through clearcutting) are expected to be limited to research projects and for timber stands with very difficult conifer regeneration issues. Creation of such stands will be limited to no more than 100 cumulative acres per decade.

**(EIR Aesthetics) Mitigation 1:** For even-aged timber harvest plans, conduct field evaluations by a RPF or his or her designee to determine the visibility of the THP area to the Forest visitor as seen from roads, trails, and recreation areas. Evaluations will include, but be not limited to, consideration of the following factors:

- the potential frequency of viewing by the general public,
- the degree and duration of vistas,
- the general topography of the THP area in relation to the view aspect,
- and type and density of forest canopy and understory cover of forest areas surrounding the THP area.

The RPF will make a finding of whether or not the evaluation leads to a conclusion that a significant impact to a scenic vista exists. Where appropriate, to visually soften and mitigate significant impacts created by even-aged management on the integrity of scenic views from designated overlooks visible to significant numbers of general forest visitors, the THP shall include one or a combination of the following: modify the configuration of the harvest area to better reflect topography and natural patch shapes; modify the configuration of the harvest area to avoid spanning ridgelines in whole, or in part; reduce the size of the individual harvests units and/or total harvest area; or leave selected standing trees along the harvest edge boundaries.

The development and construction of both the Learning Center and Interpretive Center are both listed as potential on-site actions within the EIR. Specific mitigations developed for these projects are:

**(EIR Aesthetics) Mitigation 2.** For all timber harvest plans conducted within or adjacent to Special Treatment Areas or buffer areas that are identified but not specifically defined in the DFMP, conduct field evaluations by a qualified RPF or other qualified professional, as determined by CDF, to determine the visibility of the THP area. Evaluation will consider, but not be limited to:

- the potential frequency of viewing by the general public,
- the degree and duration of views from areas of concern;
- presence of distinctive visual attributes such as rock outcrops, streams, or distinctive flora;
- type and density of forest canopy and understory cover;
- and general topography in relation to the view aspect.

Evaluations should take into account the configuration of the THP in relation to the areas around it. The RPF will make a finding whether or not the evaluation leads to a conclusion that a significant impact to a scenic vista exists. Where appropriate to visually screen views from Special Concern Areas, the Mendocino Woodlands State Park and Outdoor Center, and other state park units adjacent to JDSF, or to direct views to provide desirable vistas, modify the width of the buffer appropriately (wider or narrower). Designate timber harvest practices within buffer areas to be one or a combination of single-tree selection, hazard tree removal, or no harvesting, as appropriate.

### **Monitoring 2.**

Timing: During the life of the JDSF Management Plan

Scope: THPs within or adjacent to Special Concern Areas

Implementation: the Department

Monitoring Responsibility: the Department

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The development and construction of both the Learning Center and Interpretive Center are both listed as potential on-site actions within the EIR. Specific aesthetic mitigations developed for these projects are:

**(EIR Aesthetics) Mitigation 3:** Require the Forest Learning Center and Forest interpretive Center to be located and designed in accordance with the CEQA process to not significantly affect day or nighttime views from campgrounds or residential areas. CEQA processes also shall be followed for any other facilities, not identified at this time, that are proposed at a later date.

### **Monitoring 3.**

Timing: During facility site selection

Scope: Forest-wide

Implementation: the Department

Monitoring Responsibility: the Department

Refer to mitigations and monitoring requirements contained within this management plan: Chapter 3 – Recreation, Aesthetics and Public Use.

*Research projects that may have an impact on Heritage Resources:*

A Forest Learning Center complex and JDSF Interpretive Center at Camp 20 are both listed as potential on-site actions within the EIR. These actions will be subject to separate, project-specific heritage resources review per CEQA and/or Section 106 of the NHPA.

**(EIR Heritage Resources) Mitigation Measure 18.** When planning for or reviewing proposed demonstration and research projects that have the potential to disturb significant heritage resources, employ standard procedures described in *Archaeological Review Procedures for CDF Projects* (Foster 2003), and in the *Forest Practice Rules for the Protection of Archaeological and Historical, and Cultural Sites* (CDF 2003), and include a check of the current JDSF heritage resource database to include review of historic period sites identified by Gary and Hines (1992) to avoid potential impacts to significant heritage resources. Document heritage resources study findings in the CDF archaeological Report form, or other report format consistent with OHP (1989) guidelines.

### **Monitoring 18.**

Timing: During life of the JDSF Management Plan

Scope: Forest-wide

Implementation: the Department

Monitoring Responsibility: the Department

Refer to mitigations and monitoring requirements contained within this management plan: Chapter 3 – Heritage Resources.